

Final Report

Solver Society Project: Healthcare System

PsyBot: Your Helpful Companion
Group 02 - Astra Sinovac

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Our team

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Alfonsus Libra



Rama



Putri



Problem Statement & Objective

**Adakah yang pernah
mengalami?**

Malu (?)

Judgment (?)

Takut (?)

Stigma (?)



*“All too often, people **feel ashamed about their depression** and mistakenly believe they should be able to overcome it with **willpower alone**”*

- mayoclinic.org

*No matter how old you are or what you're going through, **healthy and close friendships encourage positive mental health and well-being.***

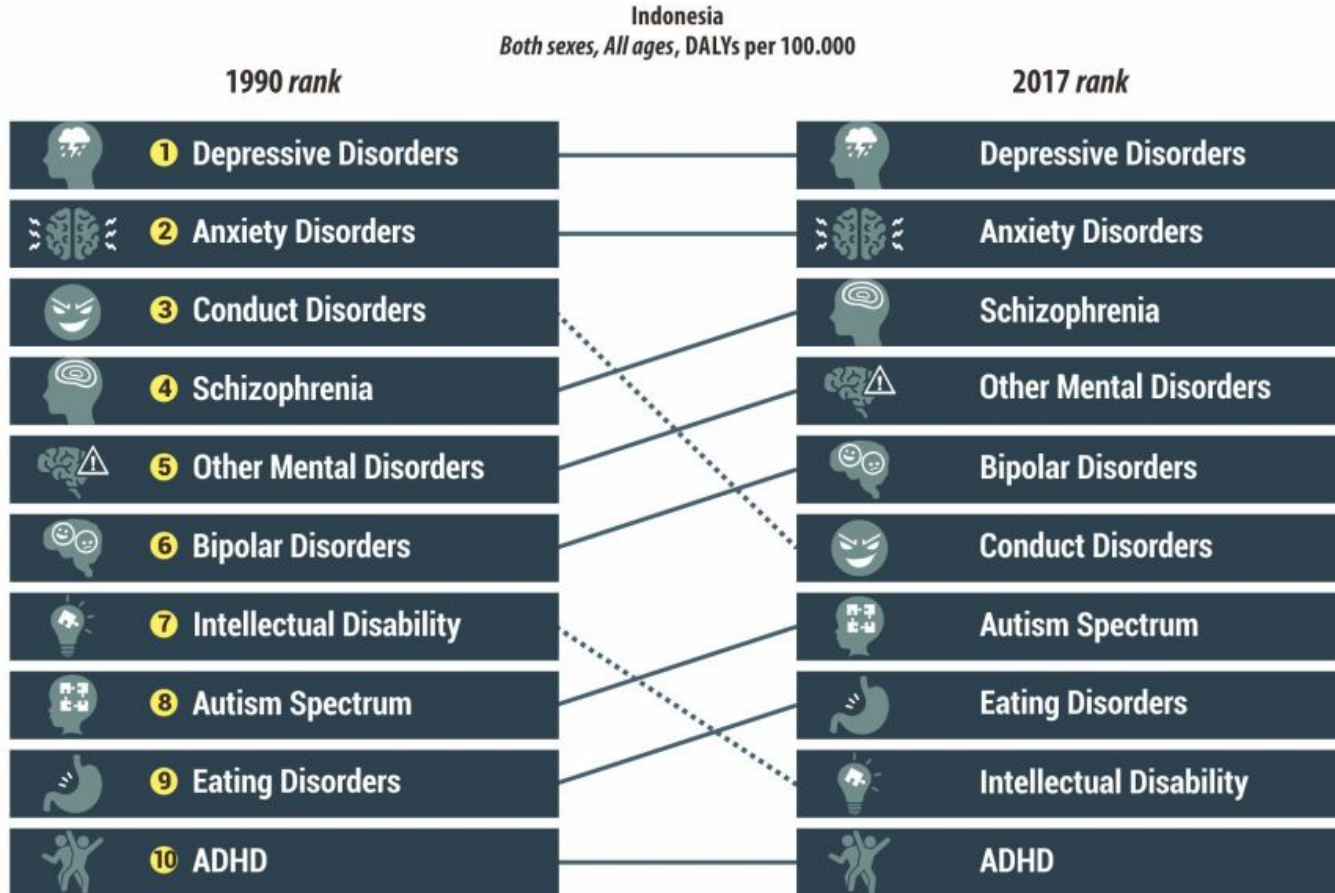
- mentalhealthfirstaid.org



Diperkirakan sekitar **300 juta orang mengidap depresi di seluruh dunia**. Bahkan, World Health Organization (WHO) memperkirakan **setiap 40 detik terjadi kasus bunuh diri di seluruh dunia yang diakibatkan oleh depresi**.

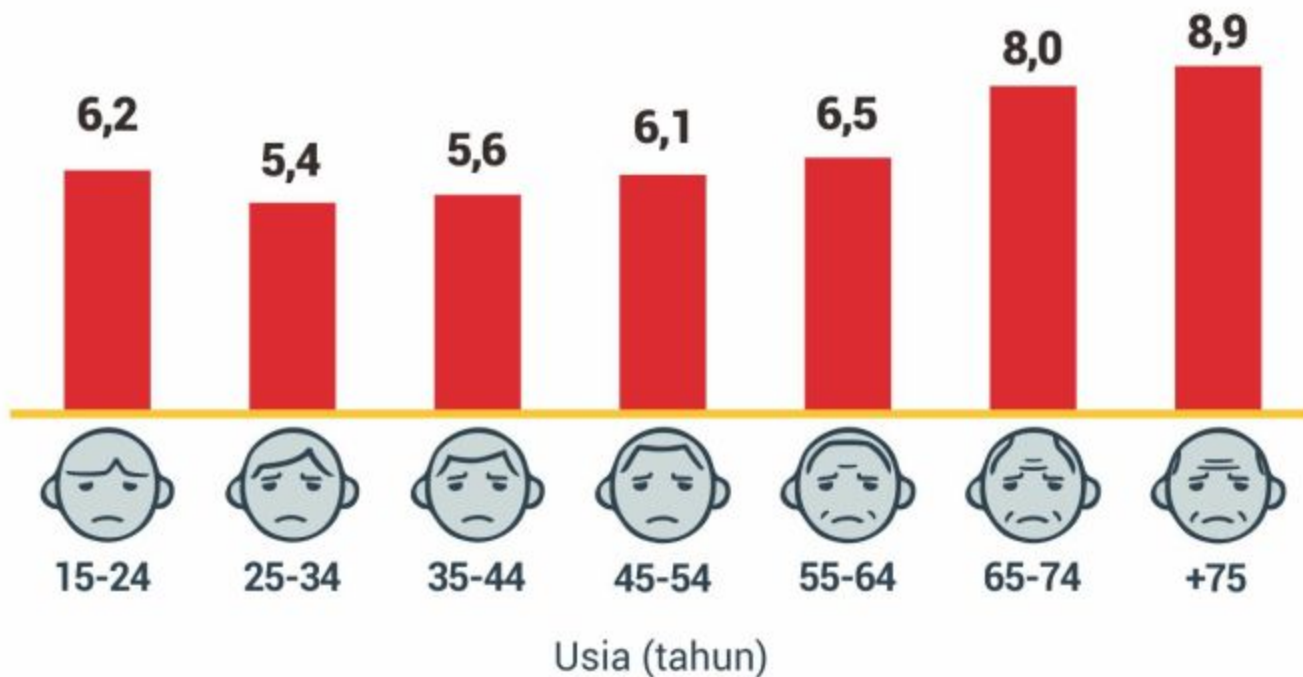
Gambar 3. 10 Besar Penyakit *Mental Disorders* Penyebab DALYs

Sumber: Institute for Health Metrics and Evaluation (IHME), tahun 2017



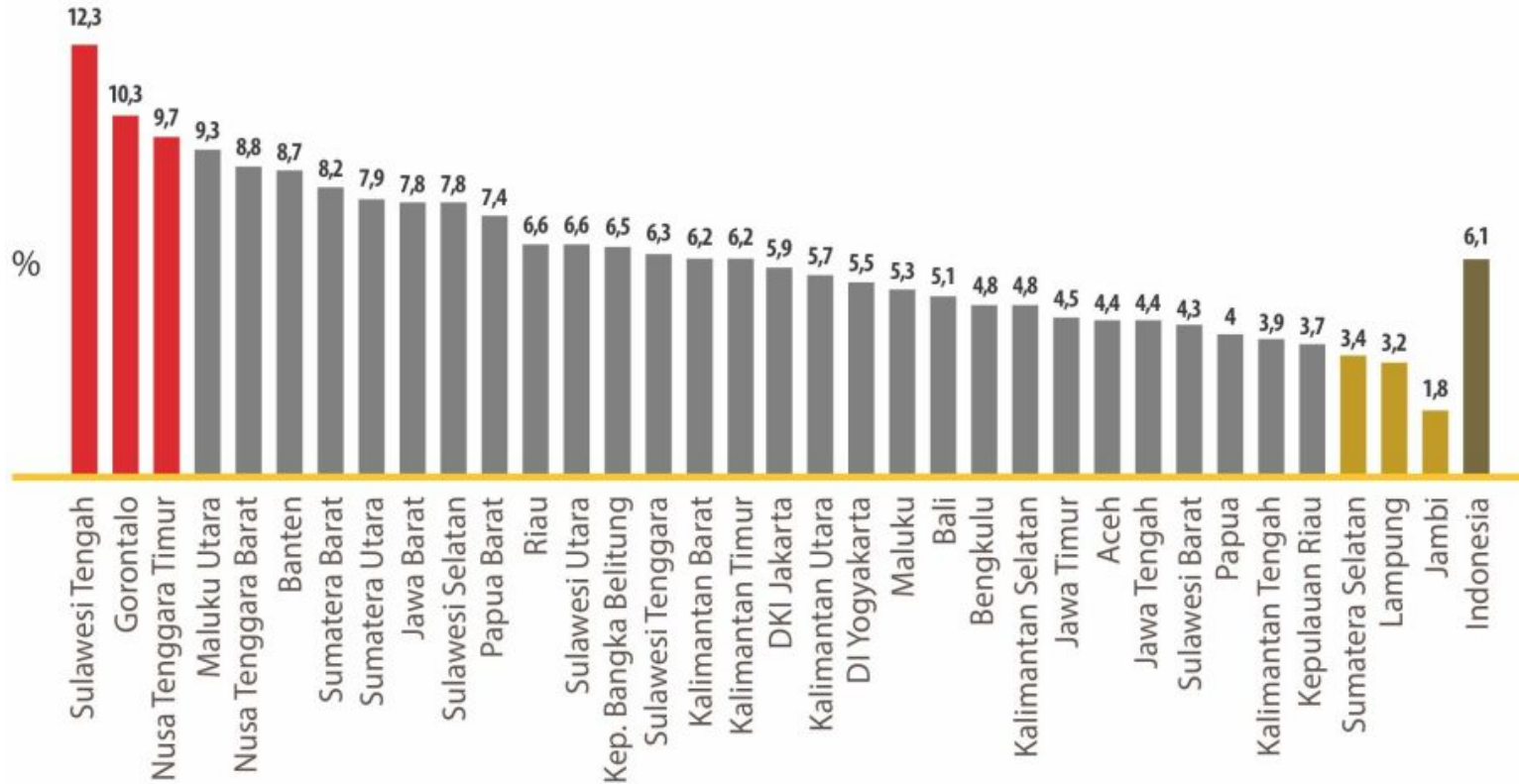
Gambar 4. Prevalensi Depresi pada Penduduk Umur ≥ 15 Tahun menurut Kelompok Umur

Sumber: Riskesdas Tahun 2018



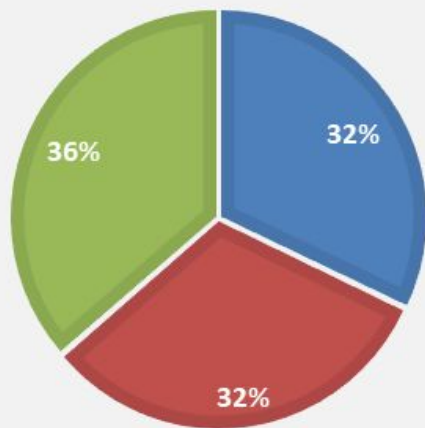
Gambar 5. Prevalensi Depresi pada Penduduk Umur ≥ 15 Tahun menurut Provinsi

Sumber: Riskesdas Tahun 2018



% MASALAH PSIKOLOGIS SELAMA PANDEMI COVID -19

■ Cemas ■ Depresi ■ Trauma Psikologis



Gejala depresi utama yang dirasakan **gangguan tidur, kurang percaya diri, lelah tidak bertenaga, dan kehilangan minat.**

Source: Perhimpunan Dokter Spesialis Kedokteran Jiwa Indonesia (PDSKJI)

PsyBot: Your Helpful Companion

Objective:

1. Menyediakan layanan chatbot sebagai *companion* dan helpful secara profesional
2. Meningkatkan kesadaran atas kesehatan mental
3. Memberikan intervensi preventif



Research Process

What Is Depression?

*Depression (major depressive disorder) is a common and serious medical illness that **negatively affects how you feel, the way you think and how you act.***

- psychiatry.org


"It is normal for feelings of sadness or grief to develop in response to such situations. Those experiencing loss often might describe themselves as being "depressed."

But being sad is not the same as having depression. The grieving process is natural and unique to each individual and shares some of the same features of depression."

www.psychiatry.org




← **Depression Quotes** 230 Tweet **Ikuti**

 **Depression Quotes** @Depressed1278 · 13 Feb ...
Why is keeping myself alive so hard?
💬 11 ↻ 703 ❤️ 1,4 rb ↗


 **Depression Quotes** @Depressed1278 · 23 Des 2020 ...
My head is currently a horrible place to be.
💬 5 ↻ 861 ❤️ 1,6 rb ↗

 **Depression Quotes** @Depressed1278 · 16 Nov 2020 ...
I disappear sometime. It's my thing.
💬 5 ↻ 555 ❤️ 1,3 rb ↗

 **Depression Quotes** @Depressed1278 · 7 Okt 2020 ...
I've been going trough the motions learning how to pretend that everything is perfect.

I've been sinking in an ocean drowning but I'm silent. Yet everyone think I'm afloat.

- Hayd
💬 5 ↻ 447 ❤️ 1 rb ↗


 **Depression Quotes** @suicidalconcept · 26 Sep ...
No one really listens. They just act like they do.
💬 1 ↻ 184 ❤️ 337 ↗

 **Depression Quotes** @suicidalconcept · 14 Sep ...
Pain is holding back tears from falling and pretending that everything is fine even when it's not.
💬 1 ↻ 183 ❤️ 309 ↗

← **Depression Quotes™** 1.290 Tweet **Ikuti**

 **Depression Quotes™** @depressingmsgs · 9 Sep 2019 ...
The worst feeling is when something is killing you inside, and you have to act like you don't care.
💬 68 ↻ 10,6 rb ❤️ 17,4 rb ↗

 **Depression Quotes™** @depressingmsgs · 9 Sep 2019 ...
when i'm hurt, i shut down, i turn into a total bitch i shut off my emotions i act differently towards everything and everyone and i hate it.
💬 58 ↻ 7,7 rb ❤️ 13,7 rb ↗

 **Depression Quotes™** @depressingmsgs · 3 Sep 2019 ...
over-thinking ruins you. ruins the situation, twists things around, makes you worry and just makes everything much worse than it actually is.
💬 27 ↻ 5,8 rb ❤️ 10 rb ↗

 **Depression Quotes™** @depressingmsgs · 2 Sep 2019 ...
i'm disappointed in myself.. because i know i'm better than the choices i keep making and the things i choose to deal with.
💬 30 ↻ 6 rb ❤️ 10,1 rb ↗

 **Depression Quotes™** @depressingmsgs · 20 Sep 2018 ...
i'm just so tired of this. my body is tired, my mind is a mess. i just really want to lay in bed and never get up. i'm just so tired of life.

 **depression quotes** @cuttingquote · 20 Jun 2020
Pain is all I know
💬 17 ↻ 1,2 rb ❤️ 2,3 rb ↗

 **depression quotes** @cuttingquote · 16 Jun 2020
I just want to disappear
💬 22 ↻ 2,9 rb ❤️ 4 rb ↗

Text Classification (Emotion Detection) Modeling

Chatbot Development

Business understanding & Data Collection

Semenjak pandemi Covid-19 isu mental health kembali gencar dibicarakan. Kelompok kami ingin membuat Text Classification menggunakan data twitter untuk mendeteksi text yang memiliki tendensi depresi dan tidak.

Data Understanding

Data yang digunakan berasal dari twitter yang berasal dari akun @depressed1278, @depressingmsgs, @cuttingquote, @suicidalconcept

Preprocessing

Exploratory Data Analysis

Data Cleansing

Feature Engineering.

Modeling & Evaluation

Pemodelan dilakukan dengan metode Auto Machine Learning (Auto ML) yang dapat langsung membandingkan beberapa algoritma secara langsung. Evaluasi model dilihat dari akurasi yang ditargetkan mencapai > 80%

Chatbot Prototype Development

Hasil pemodelan kemudian akan dideploy dalam bentuk chatbot yang dapat merespon text yang diinput oleh user.

Data Processing

INPUT

PROSES

OUTPUT

Tweet Dataset:

- Depressed
- Non Depressed



Data Cleansing:

- Removing Link
- Removing Punctuation
- Removing Emoji
- Removing Stopwords

Exploratory Data Analysis:

Word Cloud

Feature Engineering:

- Bag of Words (BoW)
- Term Frequency-Inverse Document Frequency (TF-IDF)

Data Training

Auto ML



Text Classification
(Emotion Detection)

&

Chatbot Prototype

Sober Society
By IYKRA



Result

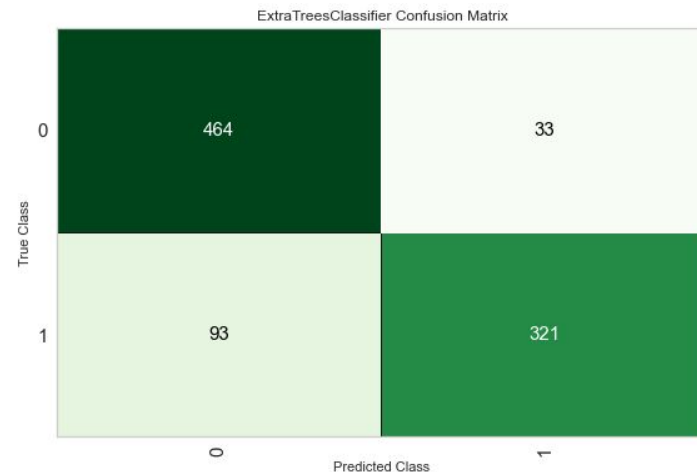
TF - IDF

	Model	Accuracy	AUC	Recall	Prec.	F1	Kappa	MCC	TT (Sec)
et	Extra Trees Classifier	0.8729	0.9487	0.7952	0.9093	0.8478	0.7395	0.7452	0.9240
rf	Random Forest Classifier	0.8715	0.9437	0.7963	0.9054	0.8465	0.7368	0.7422	0.4200
xgboost	Extreme Gradient Boosting	0.8535	0.9319	0.8954	0.8010	0.8451	0.7071	0.7119	4.5970
lightgbm	Light Gradient Boosting Machine	0.8399	0.9131	0.8755	0.7890	0.8293	0.6794	0.6837	0.4100
dt	Decision Tree Classifier	0.8343	0.8592	0.7550	0.8569	0.8021	0.6606	0.6651	0.2330
nb	Naive Bayes	0.8230	0.8654	0.7180	0.8619	0.7825	0.6356	0.6439	0.0580
gbc	Gradient Boosting Classifier	0.8121	0.9011	0.8954	0.7396	0.8096	0.6276	0.6397	1.3330
ada	Ada Boost Classifier	0.7872	0.8598	0.8817	0.7115	0.7867	0.5791	0.5943	0.4590
lda	Linear Discriminant Analysis	0.7660	0.7833	0.7276	0.7445	0.7348	0.5256	0.5270	4.8210
svm	SVM - Linear Kernel	0.7063	0.0000	0.5115	0.5955	0.4965	0.3776	0.3930	0.1590
qda	Quadratic Discriminant Analysis	0.7015	0.6793	0.4722	0.7893	0.5796	0.3720	0.4082	1.7990
knn	K Neighbors Classifier	0.6577	0.7755	0.3036	0.8722	0.4122	0.2595	0.3508	0.7140
dummy	Dummy Classifier	0.5541	0.5000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0430

Notes :

0 : Non Depressed

1 : Depressed



Hi! I am PsyBot. I am here as your companion and you can share anything to me :)

So.. How are you feeling today ? I do not feel so good today. I am just feeling alone

```
0    depressed  
Name: Label, dtype: object
```

Machine Menglasifikasikan text
sebagai 'depressed'

User Input

Respon PsyBot

Hey.. Sorry to hear that :(Hmm anyway I have several things that may be able to lighten your mood or perhaps will be helpful for you. Do you want them? Press Yes or No

Terdapat 4 Opsi yang dapat dipilih: 1) Jokes 2) Inspirational Story 3) Motivational Story 4) Professional Care

Okay :) You can choose, my friend. Do you want to: 1) Hear a joke 2) Read an inspirational story 3) Read a motivational quote 4) Talk to professional care. So.. What is your choice?

Things to Improve

DATA

Data yang digunakan membutuhkan Expert Judgment untuk menentukan apakah text tersebut memang benar memiliki tendensi depresi atau tidak sehingga label yang disematkan kepada data menjadi lebih meyakinkan

CHATBOT

Diperlukan improvisasi lebih jauh untuk produk chatbot, seperti pengembangan User Interface yang menarik atau pengintegrasian dengan Chat Platform yang sudah tersedia, seperti Telegram.

References & Datasets:

- <https://twitter.com/depressingmsgs>
- <https://twitter.com/cuttingquote>
- <https://twitter.com/suicidalconcept>
- <https://twitter.com/Depressed1278>
- <https://www.mayoclinic.org/diseases-conditions/depression/in-depth/depression/art-20045943>
- <https://www.psychiatry.org/patients-families/depression/what-is-depression>



TERIMA KASIH